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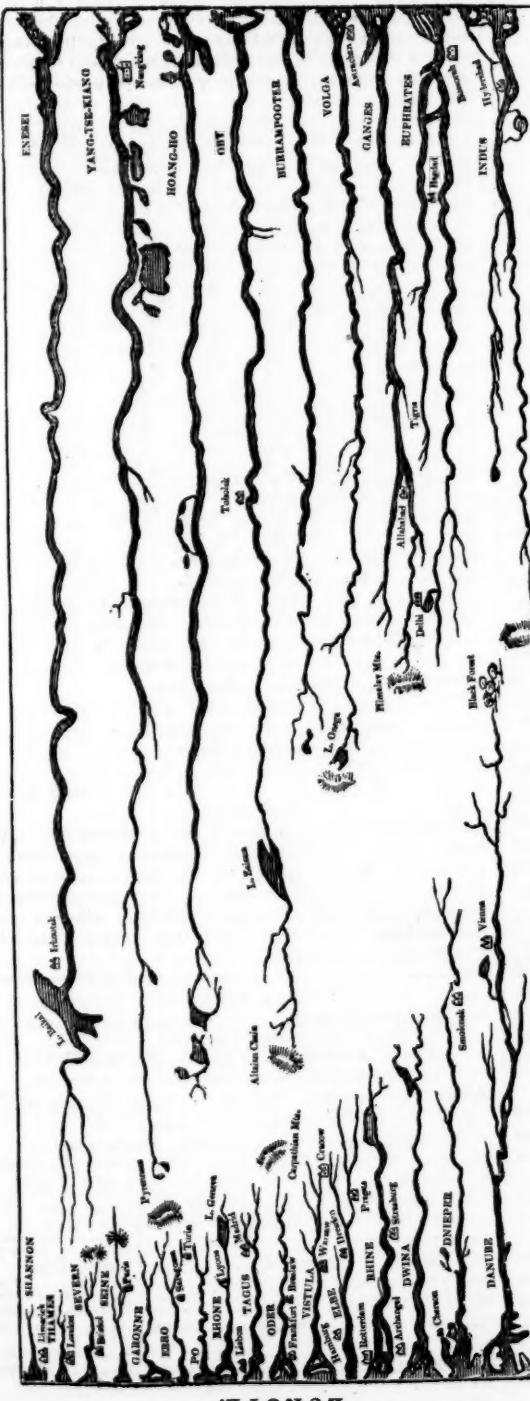
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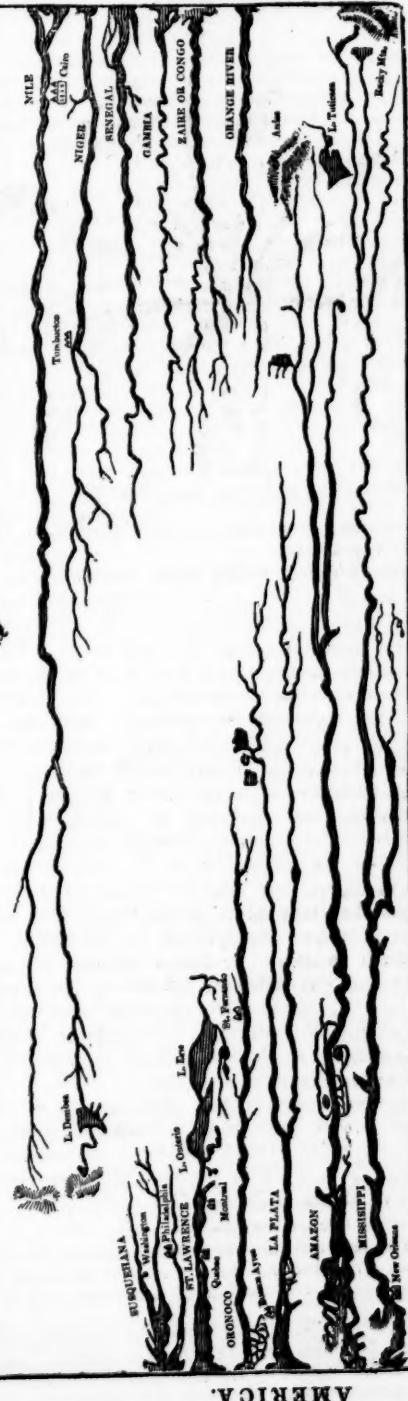
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AFRICA



E U R O P E .

AMERICA.

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VOL. I.

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GENERAL OBSERVATIONS ON RIVERS.

RIVERS are formed by the union of springs, rills, brooks, &c., and are the means by which the surplus waters of the land are conveyed to the ocean. The extensive benefits conferred by rivers upon the regions through which they flow, render the inquiry into their conditions peculiarly interesting. These streams not only form a natural boundary between countries and provinces, but afford an easy medium of intercourse to the inhabitants of distant spots upon their margins. They also assist in fertilizing the soil, and are essential to the very existence of man; while their meanderings render them delightful ornaments, and make landscapes, which without them would be beautiful, still more enchanting. So bountifully has the great Father of the Universe provided for the comfort and delight, as well as the support of His creatures.

SPRINGS.

The origin of springs, from which rivers have their source, though involved in much obscurity, may be said, generally, to proceed from the condensation of atmospheric vapours, the ascent of subterraneous exhalations, the filtering of water from the sea, and the melting of ice and snow. Atmospheric vapours are raised from the sea and from the earth by the heat of the sun; and, being condensed, by changes in the temperature of the air, descend again upon the earth in dew and rain. The coldness of elevated regions is well known, and whenever a current of wind carries the air of the sea, or of the plains, loaded with moisture, against mountains and mountain-chains, the invisible vapour in it becomes precipitated by the cold, either in the shape of snow or rain; owing to which beautiful arrangement of Providence, the sources of Rivers are always found in high grounds, from whence they flow, by a gradual descent, towards the sea; and the continents of the world are formed much higher in the interior than towards the coast: otherwise the falling rain would have produced unwholesome, uninhabitable marshes, in those countries which are now the delightful abodes of man, and supply the means of his subsistence. The source of the Rhine, for instance, is about 6000 feet above the level of the German Ocean, into which it falls after a course of 840 miles. The sources of the Danube are in the same mountains, and may be traced up to about the same level; and this river flows 1833 miles eastward to the Black Sea. The Rhone flows southward from the same chain 510 miles; and the various branches of the Po descend from the other declivity of this mountainous region, and, after a course of 430 miles, reach the Adriatic Sea, or Gulf of Venice, at no great distance from that celebrated city.

Springs are merely the out-breaking of water that has fallen upon the earth and sunk through the surface, where it was absorbed; so that when the earth is fully charged with water, they are most abundant; and after a season of drought they become exhausted, and in elevated parts of the country they entirely cease to flow, and the wells become dry, as has been very generally the case in this country during the latter part of the present summer. The difference in the fall of rain in elevated and in low regions, is remarkably shown even in this country; for by experiments, continued for a period of years, it has been found that in Westmoreland, which is mountainous, the average of rain is sixty-three inches perpendicular depth per annum; while in Middlesex and Hertfordshire, which are nearly level, the fall does not much exceed twenty inches. The periodical overflow of the Nile, which covers the land of Egypt, is well known; but all this water comes from a range of mountains in the centre of Africa, 3000 miles distant from the Delta of Egypt.

Rivers are very much supplied by the melting of snows in summer, which have fallen on mountainous ranges during the preceding winter; and when the changes of temperature in the spring of the year are very considerable, the effects upon rivers flowing out of these regions, are sometimes quite surprising: for instance, in the present year, the River Ohio, a considerable branch of the Mississippi, rose seventy-eight feet in perpendicular height above its ordinary level, and in the flat country adjoining the Mississippi caused an overflow of the water 150 miles wide.

Besides these collections of water from external causes, springs and fountains have an extensive origin in an internal formation, caused by the combination of oxygen and hydrogen gases, which, whenever they meet, decompose each other, and produce water.

Springs are of several kinds, according to the preponderating cause of their origins; as perennial, temporary, intermitting, or reciprocating. The first, or perennial springs, seem to be supplied by the gases just mentioned; they flow continually, with little or no variation in the quantity of water they emit. Temporary springs flow only during certain seasons of the year, and are probably supplied by rain and melted snow. Intermittent springs flow and stop alternately, in consequence, it is presumed, of their connexion with the sea. Reciprocating springs flow constantly, but in a variable manner as to quantity; of which the cause has not been well explained.

In the formation of lakes, we see another instance of the consideration of Providence, for they operate, in most cases, like immense cisterns for receiving these sudden accumulations of waters; so that the rivers forming their outlet are not increased, by sudden falls of rain or melting of snow, in any thing like the degree they otherwise would be, because the quantity of water which is sufficient to raise suddenly the surface of a lake one foot, would, perhaps, raise the river fifty feet, if it were not so spread out over a large space. The winding of rivers, which adds so much to their beauty and to their fertilizing effects, has also another most important effect, which is evidently the work of the Parent of Good, that is to say, it retards the flow, and preserves the water in them three or four times as long as it would otherwise remain in the channel; but for this, the formation of lakes, and the deposit of water in the earth itself, the upper part of the course of rivers would be entirely dry after a few weeks' cessation of rain, and the elevated regions of the earth would be infinitely less habitable than they are at present.

COURSES OF RIVERS.

Rivers usually rise in elevated regions; and the origin of the largest may generally be traced to a small rill, oozing from a bed of sand, or clay, and descending from nearly the summit of some mountainous chain. This insignificant stream receives in its course the tributary waters of numerous brooks and rivulets; so that by the time it reaches the plain, it becomes a tolerably broad river. In its progress to the place where it discharges its waters, either into the ocean, or into some river more considerable than itself, it is increased by many smaller streams: thus, the Volga receives the waters of more than two hundred rivers and brooks, before it falls into the Caspian; and the Danube is enriched with an equal number, in its way to the Black Sea.

It sometimes happens that two or more rivers have their springs upon, or near, the summit of the same mountain or chain, but flow down in different directions; which has led to an erroneous notion that they have but one common source.

The course, or run, of rivers, is of variable length; extending from a few to some hundreds, or even thousands, of miles. It is determined by the several circumstances of distance from the source to the sea, or other mouth; the nature and arrangement of the country which it traverses; the number and magnitude of its tributary streams; and the peculiarities of the climate, in respect of temperature, seasons, &c. Generally, the extent is in proportion to the height of its source; and it always bears a relation to the surface of the valley, of which it receives the auxiliary waters.

The beds, or channels, of rivers, are partly owing to those revolutions, as earthquakes and volcanic eruptions, which, at different times, have altered the face of the earth, and partly to the natural action of the rivers themselves. To the former may be ascribed the remarkable examples of rocks and large beds of compact strata penetrated by rivers, of which the velocity and weight are far from being considerable. The latter may be naturally expected in loose and soft soil, which readily gives way to a gentle pressure of long continuance, assisted by the soaking of the parts acted upon. Great alterations are made in the sides and bottoms of the beds in the course of time; some parts being depressed, or worn down, by the force of the current, while others are raised by the gradual deposition of mud and other products of the soil brought down from a distance. Hence it happens, that the entire course of a river is sometimes changed, more especially towards its mouth. As rivers proceed from their sources to their terminations, their channels are usually increased in breadth, except when they flow through narrow passes between rocks or

mountains, which give the current an increase of velocity proportioned to the compression they occasion at its sides. When obstacles of this nature stretch across a valley, so as to leave no immediate outlet for the waters, a lake is formed, into which the stream continues to flow, till, rising above the interposing dam, it rushes down the opposite side in a cataract, and resumes its progress through the lower parts of the succeeding valley.

The rapidity with which a river flows depends upon the quantity of its waters, the breadth of its channel, and the declivity of its bed: for, as the breadth of the channel is greatest in a plain country, the current will be there slower than in a sloping mountainous district.

The mouths of rivers are various in their appearances. In some cases, the water glides smoothly into the sea, mixing almost immediately with its waves; in others, the force of the river and the volume of its waters are so considerable, as to preserve a well-marked distinction between the fresh water and the salt, to a great distance from the place where they meet. Such is the case with the rivers Maranon and La Plata; the former of which sends an immense body of water into the ocean with such force, that it remains unmixed with the briny wave to the distance of eighty leagues. When the current of a river almost stagnates in a level country, its course is disturbed by every trifling obstacle, and a variety of outlets is the consequence. This diminished velocity also allows the waters to deposit the earthy particles which the current had brought down from the higher and more rapid parts of its course; and alluvial tracts are formed at the outlet, as in the cases of the Rhine, the Volga, the Ganges, the Nile, the Niger, the Oronoco, and many other large rivers. Sometimes, these sluggish streams deposit banks of sand, of greater or less extent, through which the water seems scarcely to find a passage into the ocean. Lastly, there are some rivers, whose currents are, for a time, so retarded by the tides of the sea, that their waters are thrown back, so

that they overflow their banks, and inundate the surrounding plains to a great extent.

The greatest velocity of a river is usually about the middle of its breadth and depth, and the least towards the bottom and sides.

PECULIARITIES OF RIVERS.

Several of the rivers in the following list consist of two or more streams, bearing various names in the countries through which they respectively flow. But the measurement, commencing at the fountain-head and continuing to the entrance of the river into the sea, is to be understood as comprising the whole, under whatever denomination the parts may be geographically known. Some rivers, which preserve their name from beginning to end, are in themselves inconsiderable; but receiving in their progress the waters of larger rivers, they become magnificent streams, and, by retaining their own title, cast a shade over others to which they are indebted for their importance. In some cases, as of the Nile, two streams contribute by their union to form one large river, which thus appears to have two sources; and it seems difficult to decide which of the two is the main channel.

COMPARATIVE SIZE OF RIVERS.

In comparing the sizes of different rivers, and the masses of water they contain, we must take into account the length of their course, their breadth, and depth; together with their velocity at various parts. This is obviously a difficult, and, it may be added, almost an unattempted task. It is easy enough, on the whole, to compare many of them together, as to their length, or breadth, or depth, &c., separately; but all these require to be combined, in order to exhibit their true relative magnitudes and proportions. Major Rennell, in his *Memoir on Hindooostan*, has given a list of the relative lengths of rivers, the Thames being taken as unity, from which the following scale is constructed:—

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Thames.	Rhône	Seine.	Tagus.	Gambia (44)	Senegal.	Indus.	Danube.	Volga.—Iravadi.—Burram.	Enesci.	Obi.—McKenzie.	Nile.	La Plata.	Lenz.	Amur.	Hourghado.
					Rhine.—Nerbuddah.	Don.—St. Lawrence.	Euphrates.	Del Norte.							Marmara, or R. of Amazonas.
								Upper.—Ganges.							Yau-tee-Kiang.

According to this scale, the Rhône is three-fourths longer than the Thames; the Seine twice and a half as long; the Tagus three times; and so of the rest. The length of the Thames is assumed to be about forty-five leagues, or nearly one hundred and fifty-six miles; the multiplication of which by the number standing against any given river, will show its length in English miles. But the Major's computations do not exactly accord with the existing amount of information on the subject. Hence the Plate at the head of this article will be found to differ materially from him. Till lately, the Maranon, or River of Amazons, was supposed to be the longest river in the world; but it is now ascertained that the Mississippi (an Indian name, signifying *Father of Waters*) and Enesci exceed it. Major Rennell also estimates the extent of the Thames too low; its length being, according to the latest admeasurements, two hundred and fifteen miles.

With this explanation, the reader will be able to appreciate the motives by which we have been guided in the construction of our CHART OF THE PRINCIPAL RIVERS IN THE FOUR QUARTERS OF THE WORLD. It is formed from

the best recent authorities, and is at least an approach to the truth; subject, nevertheless, to correction from future observations and discoveries.

The Chart exhibits the rivers as drawn out in straight lines, or nearly so, for the purpose of comparison; and some remarkable places, as cities or towns, on their banks, and lakes through which they run, are inserted at their respective distances from the mouth of the river to which they belong.

In the following Table, which may be considered as an Appendix to the Chart, the rivers are set down in their relative proportions, the Thames being taken as *unity*, that is, being reckoned as the number one. This will be found convenient for the memory, which more readily receives and retains a comparative measurement, than a series of abstract numbers. In addition to this general method, the measurements are given in English miles; together with the countries through which the rivers flow, the sites of their origins, principal towns, &c., by which they pass, and the ocean, &c., into which they discharge their waters. The names in *italics* have been omitted on the Chart, for the sake of clearness.

RIVERS OF EUROPE.

Ratio of Length.	Names.	Locality.	Rise.	Places passed by.	Discharge.	Length in Eng. Miles
1	Forth	Scotland	BenLomond Mtns.	Glengyle, Stirling, Edinburgh	North Sea, near Dunbar.	110
1	Tay	Scotland	Grampian Hills	Lochs Dochart and Tay; Dunkeld, Perth, Dundee.	North Sea, by the Firth of Tay.	185
1½	Trent	England	Norton, Staffordsh.	Stone, Rud-eley, Burton, Farndon, Gainsborough.	North Sea, by the Humber.	200
1½	Shannon	Ireland	Mountains of Leitrim	Loughs Allen, Rea, Dergart; Killaloe, Western Ocean.	Limerick, Tarbert.	205
1	THAMES	England	Cotswold Hills	Reading, Henley, Windsor, Staines, Brentford, London, Gravesend.	North Sea, at Shepp. Isle.	215

Ratio of Length.	Names.	Locality.	Rise.	Places passed by.	Discharge.	Length in Eng. Miles
1 ¹	Guadalquivir ²	Spain	La Mancha Mountains, Andujar, Cordova, Seville		Gulf of Cadiz, near San Lucar.	340
1 ¹	Severn	England	Plynlimmon Moun- tains, Montgomerysh.	Llanidloes, Montgomery, Shrewsbury, Bewdley, Worcester, Tewkesbury, Gloucester.	Bristol Channel, near Cardiff.	350
1 ¹	Garonne	France	Mont Perdu	Toulouse, Castel Sarrasin, Agen, Bourdeaux.	Bay of Biscay, thro' the Gironde.	380
1 ¹	Guadiana	Spain	Sierra Morena	Medelin, Badajoz.	Gulf of Cadiz, near Avamome.	400
1 ¹	Ebro	Spain	Mounts. of Asturias	Reynosa, Frias, Logroño, Tudela, Saragossa, Mequinenza, Tortosa.	Mediterranean	400
1 ¹	Douro	Spain and Portugal	Mountains of Soria.	Aranda, Tordesillas, Zamora, Miranda, Oporto.	Atlantic	400
2	Pô	North Italy	Mount Viso	Turin, Chivasso, Casal, Cremona, Rovere.	Gulf of Venice, at Port Maestra.	430
2 ¹	Seine	France	Côte d'Or Mounts.	Châtillon, Troyes, Melun, Paris, Mantes, Andelys, Rouen.	British Channel, between Havre and Honfleur.	450
2 ¹	Rhône	France	Mont Furca	Lake of Geneva, Geneva, Lyons, Vienne, Valence, Montelimart, Avignon, Arles.	Mediterranean	510
2 ¹	Loire	France	Mont Gerbier	Le Puy, Roanne, Nevers, Orléans, Blois, Tours, Nantes.	Bay of Biscay, near Paimboeuf.	520
2 ¹	Tagus	Spain and Portugal	Sierra Molina	Aranjuez, Toledo, Talavera, Abrantes, Santarem, Lisbon.	Atlantic	580
2 ¹	Oder	Prussia	Carpathian Mounts.	Ratibor, Kosel, Oppeln, Breslau, Glogau, Ratibor, Kosel, Oppeln, Breslau, Glogau, Baltic, between Crossen, Frankfort, Custrin, Stettin, Usedom and Wolin.	Baltic	590
3 ¹	Vistula	Poland	Carpathian Mounts.	Cracow, Warsaw, Thorn, Graudenz, Baltic, between Marienwerder.	Baltic	650
3	Dniester	Russia	Carpathian Mounts.	Sambor, Mohilev, Dobozar, Bender, Ovidiopol.	Black Sea, between Odessa and Akerman.	700
3 ¹	Elbe	Germany	Sudetic, or Giants' Mountains.	Königgratz, Nimberg, Dresden, Torgau, North Sea, near Wittenberg, Magdeburgh, Lunenburg, Hamburg.	North Sea, near Cuxhaven.	770
3 ¹	Rhine	Germany	Mont St. Gothard.	Chur, Lake of Constance, Constance, Schaffhausen, Basle, Old Brisach, Strasburgh, Kehl, Spire, Manheim, Worms, Ments, Coblenz, Wesel, Nimegen, Rotterdam.	North Sea	840
4 ¹	Don	Russia	Toula	Dankov, Voronetz, Bongautch, Khopersk, Sea of Azof	Sea of Azof	980
4 ¹	Dwina, or Duna	Russia	Heights of Vologda	Lake Koubinak, Kadnikov, Vologda, White Sea, by Totma, Veliko-Osting, Krasnoborsk, Archangel Bay.	White Sea	1000
6 ¹	Dnieper	Russia	Heights of Smolensk	Dorogobouj, Smolensko, Moghilev, Rogatchev, Kiev, Tcherkasy, Ekaterinoslav, Alexandrovsk, Kherson.	Black Sea	1390
8 ¹	Danube	Germany	Black Forest, Baden	Vohrenbach, Tuttlingen, Sigmaringen, Ulm, Donauworth, Ingolstadt, Ratibor, Straubing, Deckendorf, Passau, Vienna, Presburgh, Peterwaradin, Belgrade, Widin, Ismail.	Black Sea	1833

RIVERS OF ASIA.

3 ¹	Kistna, or Krishna	Deccan	Ghauts Mountains.	Sattarab, Kadloor, Codapilly	Bay of Bengal	650
3 ¹	Nerbuddah	Hindoostan	Near Ajmeergur	Gurrah, Hoosinagabad, Hindia, Burwaunce, Hansoot.	Gulf of Cambay	700
3 ¹	Godavery	Hindoostan	Ghauts Mountains.	Nassuck, Nundere, Gerapoorum, Mun-	Bay of Bengal, between Coringa and Masulipatam.	800
3 ¹	Tigris	Asiatic Turkey	Mounts. of Armenia	Ardis, Diarbekir, Jezireh, Mousoul, Euphrates	Euphrates	800
7 ¹	Indus	Caubul & Moultan	Himalay Mountains	Gortope, Chassircough, Durras, At-	Bay of Orman	1700
8 ¹	Irrawadi, or Ava	Tibet and Pegu	Desert of Cobi	ock, Maree, Dureea Khan, Backor, Schwaun, Hyderabad, Tattah.		
8 ¹	Euphrates	Asiatic Turkey	Mounts. of Armenia	Panaenduan, Bhamno, Moyeen, Hentha, Amarapura, Ava, Patanagoh, Prome, Rangoon, Bassein.	Bay of Bengal, between Cape Ne-	1800
8 ¹	Amur, or Saghalien	Mongolia	Khan Ola Mountains	Turba Caleh, Malazerd, Askola, Kibban Madan, Tomiesh, Ilija, Samisat, Bir, Racca, Karkisnia, Hit, Anbar, Hillah, Gorna Bassora.	Rangoon & Rangoon.	1840
8 ¹	Ganges	Hindoostan	Himalay Mountains	Nertchinsk, Yacza, Saghalien-Oula, Hotun, Tondon-Cajou.	Sea of Okotsk, opposite Saghalien I.	1850
9 ¹	Lena	Siberia	Heights of Irkoutsk	Gangoutri, Serinagur, Allahabad, Benares, Patna, Monghir, Comercy.	Bay of Bengal	1850
10 ¹	Volga (sometimes reckoned among European rivers.)	Russia	Heights of Valdai, on Ostachkov.	Tver, Jaroslav, Kostroma, Niznei-gorod, Kazan, Simbirsk, Samara, Saratov, Astrachan.	Caspian Sea	2190
10 ¹	Burrampooter, or San-poo.	Tibet	Himalay Mountains	Rincapou, Sameri, Tacpounoi, Tchamea, Poolee Gutteah, Kollong, Rangamutty, Tengra.	Bay of Bengal	2200
13 ¹	Obi and Irtisch	Siberia	Altai Mountains	Abichai, Nor Zaizan Lake, Semipolatni, Omsk, Tara, Tobolsk, Samarova, Bereshev.	Arctic Ocean, by the Naolim Gulf.	2800
14 ¹	Hoang-ho	China	Desert of Cobi	Lakes Teharing and Orning; Great Wall, Yellow Sea	Yellow Sea	3040
15 ¹	Yang-tse	China	Desert of Cobi	Lantchoo, Poelotching, Pauthchoo, Kai-fongfoo, Siutchoo, Hoinganfoo.	Yellow Sea, below Nankin.	3220
16 ¹	Enesci, or Yenessi	Siberia	Altai Mountains	Kela Mountains, Paha-tom-khol, Ma-hoofoo, Tchonkinfoo, Queitchoofoo, Vootchangoo, Nankin.	Arctic Ocean, between Cape Matzol and Obiono.	3580

RIVERS OF AFRICA.

Ratio of Length.	Names.	Locality.	Rise	Places passed by	Discharge.	Length in Eng. Miles.
5 1/4	Orange	..... Namaqualand	..... Batjouanas' Country	Khing, Kingsland Plain, Table Moun- tain, Bern's Knoll, Cok's Knoll, George IV's Cataract, Fella.	Atlantic, near C. Volta.	1090
5 1/2	Zaire, or Congou	..... Congo	Lake Aquilunda, — (supposed.)	Canga, Concoberla, Essemo, Gonda Yonga, Voonda, Sonho.	Atlantic	1200
6	Gambia	..... Senegambia	Hts. of Foota Jallon	Toulou, Rumbde Iala, Cacagne, Man- gelli, Pisania, Contou, Kayee, Tende- bar, Bathurst	Atlantic	1300
6 1/2	Senegal	..... Senegambia	Hts. of Foota Jallon	Laby, Poredaka, Teembo, Kayee, Galam, Kongnem, Beldiata Faribe, Fort Podor, Manga, Serinpalé, Bouxur.	Atlantic, near Isle St. Louis.	1480
7 1/2	Niger	..... Nigritia	Mountains of Loma	sankari, Yamina, Sego, Jenne, Timbuc- too, Kaffo, Youri, Boussa, Funda, near Cape For- mosa.	Gulf of Guinea, Benin.	1800
15 1/2	Nile	..... Egypt and Abyssinia	1. Donga Mountains 2. Sacala, in Abyssinia	Halifain, Goos, Mograt, Merawe, Don- gola, Esouan, Ediou, Esneh, Ghennah, Es-Siout, Minieh, Benisouef, Cairo and Damietta.	Mediterranean, betw. Alexandria	3240

RIVERS OF AMERICA.

2 1/2	Susquehanna	..... United States	Cooper's Town, New York.	Chesapeake Bay, between Elton and Bellair.	600
3 1/2	Colorado, or Mendoza	La Plata	..... Andes	Atlantic	650
5 1/2	St. Lawrence	..... Canada	State of Ohio, near Fort St. Mary	Lake Erie and Ontario; Kingstown, Isle St. Francis, Montreal, Lake St. Peter, Quebec.	1180
5 1/2	Ohio	..... United States	Alleghany Mounts.	Pittsburgh, Steubenville, Cincinnati, Mississippi River, Louisville, Henderson.	1188
6 1/2	Bravo' del Norte	..... Mexico	Sierra Verde	Albuquerque, Passo del Norte, Revilla, Gulf of Mexico ..	1400
7 1/2	Oronoco	..... Columbia	Maquilada Mounts.	Lake Ipava, Esmeralda, St. Barbara, St. Fernando de Itabapo, St. Borja, Cay- cará, Angostura.	1600
7 1/2	M'Kenzie	..... Indian Territory	Rocky Mountains.	Forts Fork and Peace River; Slave Lake, Arctic Sea, opposite Whale Isle.	1630
11 1/2	La Plata and Parana	La Plata & Brazil	Heights of Itambe.	Jurueca, Barluranti, Guaira, Corrientes, Cordova, Sta. Fe, Buenos Ayres, Montevideo.	2400
15 1/2	Maranon, or Amazon	Brazil	Heights of Cicacica	La Paz, Zarata, Pueblo de los Reyes, St. Joaquin, Nogueira, Obydos, Santarem, Almeirim, Macapa.	3350
17 1/2	Mississippi & Missouri	United States	Rocky Mountains.	Biddle Lake, St. Louis, New Madrid, Gulf of Mexico ..	3760
				Natchez, New Orleans.	

PRINCIPAL RIVERS OF EUROPE.

THE SHANNON.

The *Shannon*, in Ireland, originates in a small lake, a few miles south of Sligo; and, soon afterwards, falls into Lough Allen. Here it seems to be lost; but it comes out from the southern extremity, with an increase of water, and passes successively, with similar advantages, through Loughs Esk and Ree, into which, also, several considerable rivers and brooks empty themselves. The *Shannon*, thus increased, now becomes a noble river, and after flowing through Lough Derg, where it receives fresh accessions, it passes Limerick, and expands into a grand estuary, or arm of the sea, opening into the Atlantic Ocean. The *Shannon* is, therefore, a collective stream, rather than an original river.

THE THAMES.

The same may be said of our *Thames*, which rises on the south-eastern side of the Cotswold hills, in Gloucestershire, in which spring the four rivulets of the Lech, the Coln, the Chiron, and the Isis; each of which is so small, that a man may check its progress with his foot. The first three fall into the *Isis*, by which name the river is known till it has passed Abingdon, in Berkshire. By this time, from the junction of several streams, some of them larger than itself, it becomes a broad river. At Dorchester, about seven miles below Abingdon, it is joined by the *Thame*, a moderately broad stream formed by the union of many rivulets in the centre of Buckinghamshire. This junction, though with a stream of less size, is fatal to the *Isis*, so far as its name is concerned; for, during the remainder of its progress, it is known by the appellation of *Thames*, formed, as is believed, by a combination of the two titles *Thame*-*Isis*. From this point, it proceeds by a very circuitous course to London, and thence, in a general easterly direction, to the North Sea, of which it forms a grand estuary between the Kentish and Essex coasts.

THE SEVERN.

The *Severn*, another English river, and inferior to the *Thames* only in local importance, is one of the most extensive and rapid in the kingdom. Issuing from the eastern side of the Plynlimmon hills, it takes a north-

easterly course through Montgomeryshire, receiving in its way several rivulets, and reaches Shrewsbury, in Shropshire: it then makes a bold sweep through the counties of Worcester and Gloucester, and, suddenly widening below Bristol, opens into the Bristol Channel. This river has more of an original character than many others; for, though enriched by other streams, it retains its name from the fountain-head till it enters the ocean, and is uninterrupted by lakes. It is remarkable for the impetuosity of its tide, which sometimes rushes in, with a head of water, called *á bore*, at a height of three or four feet, accompanied with an astounding noise. This is occasioned by the sudden contraction which the river gives, at its mouth, to the waters of the Atlantic, as they flow in.

THE SEINE.

The *Seine*, one of the most picturesque rivers in France, is more indebted for magnitude to its tributary streams, than to the resources of its spring. All the rivers are considerable, and have their auxiliaries, the waters of which fall into one common channel, called the *Seine*, from one of the lesser rivulets which contribute to the supply.

THE GARONNE.

The *Garonne*, another river of France, issuing from the Pyrenees, is a small stream, till joined by the *Arriège*, the *Tarn*, the *Aveiron*, and the *Lot*; after which it becomes a large river. Below Bordeaux, it is further increased by the *Dordogne*: it then obtains the name of *Gironde*, and opens into a large estuary of the Bay of Biscay.

THE RHÔNE.

The *Rhône* affords an instance of an auxiliary superseding its principal, and giving name to a river, to which, naturally, it is tributary. From a vast mass of ice, in an Alp, rising ten thousand feet above the level of the sea, between the canton of Uri and the Valais, gushes the *Rhône*; and as it rolls about 90 or 100 miles across Switzerland, its waters are augmented by an almost infinite number of torrents and streams, from the adjacent mountains. At length, it pours its vast volume of water into the lake of Geneva; and re-issuing from the opposite extremity,

enters France. There it joins the Saône, and, according to the direction of the two streams, the one flowing in nearly a straight direction, from north to south, and the other joining it from the east, it ought to lose its name; but, being the most powerful, it retains its original appellation till it enters the Mediterranean, by several mouths, a few miles west of Marseilles.

THE RHINE.

The *Rhine* affords an instance of a large river losing its name before it reaches the ocean. It arises amidst deserts of ice and snow, near the summit of the Alps, in the Grisons' country, and being quickly joined by two other streams, called the Middle and Upper Rhine, which descend from the same mountainous regions, from heights exceeding 6000 feet, the united waters work their way through the solitary valley of Rhinewald, sometimes flowing secretly beneath arches of perpetual ice, at others, descending with impetuosity over rocks of granite, and appearing to gain new strength from every opposing obstacle. After quitting the Rhinewald, and receiving various torrents, the Rhine vases through the Lake of Constance, and forms the

northern boundary of Switzerland, as far as Basle. It then assumes a northerly course, forms a boundary between France and Baden, and reaches Mentz and Cologne, whence it proceeds to Cleves, and enters the Netherlands, where it divides into several branches, each of which receives a particular denomination, and enters the North Sea at a different place, but the name of the Rhine is lost.

THE VOLGA.

The *Volga*, though commonly reckoned among the rivers of Asia, is in reality the longest river in Europe, and, with the exception of the Danube, contains the largest volume of water. It originates in two small lakes, south-east of Lake Onega, among the Valdai mountains, and before it reaches Kasan, receives many secondary rivers. Below that city, it is joined by the Kama, which brings in the waters of a great extent of country. It then turns southward, and forms the boundary between Europe and Asia, for nearly four hundred miles; after which, resuming its easterly direction, it enters Asia, and rolls its majestic volume of waters, by many mouths, into the Caspian Sea.

PRINCIPAL RIVERS OF ASIA.

THE ENESEI.

The *Enesel*, or *Yenesel*, consists of a series of streams, one of the least important of which gives name to the whole. The *Enesel*, properly so called, rises among the Altai Mountains, in the high lands of Mongolia, and penetrating between the hills, takes a northerly course through the governments of Kholyvan and Tobolsk, to the Arctic Ocean. During its course, which deviates but little from a straight line, it receives several rivers, more considerable than itself, besides some rivulets; so that from being a mere brook, it becomes, at Eneselisk, a broad river. For this accession, it is mainly indebted to the *Angara*, which flows into it a few miles above Eneselisk, and is, indeed, the stream by which the length of the river is measured, agreeably to the opinion of many oriental writers, who, observing its superior extent and magnitude, say the *Angara* receives the *Enesel*, and afterwards flows into the Arctic Sea. This river, the *Angara*, rises on the south side of the Altai Mountains, or rather on the broad summits of that range, and, flowing in a westerly direction till it finds a declivity, enters the province of Irkoutsk, where it falls into the Lake Baikal, on the south-east side. During this course, it receives the waters of two streams which issue from small lakes on the south-west. From the north-west side of the Baikal Lake, out about fifty miles south of the confluence of the river just described, flows out the *Angara*, which is considered a continuation of the same stream; this takes a zig-zag direction, receiving in its progress the waters of the adjoining high lands, and at length falls into the *Enesel*, above Eneselisk, where it loses its name. In the measurement of the *Enesel*, therefore, it must be remembered, that the length of the *Angara* is included, and that from the place of its junction, the original river is neglected.

THE OBI.

The *Obi* presents a nearly similar instance of irregularity in the estimate of length, but in a contrary order. A small stream, called the *Dschabekan*, formed by the junction of the *Sira* and some other rivulets, which issue from the Great Altai range, in Mongolia, passes, first by an underground channel, and afterwards through an opening of the Lesser Altai Mountains, into the *Altyn* or *Teletskoe* Lake, from which, on the northern extremity, issues another river, called the *Byia*. These are considered as one and the same river, under different names. As it proceeds, it receives several other streams, and obtains the name of *Obi*, between Barnaul and Kholyvan. It then flows in a serpentine direction towards the north and north-west, continually increased by other rivers, till it meets the *Irtisch*, which rivals it in magnitude; but the *Obi* still preserves its name; though it is evident that the stream, from this point, is a continuation of the *Irtisch*. After this junction, the river, which is now several miles in breadth, flows northward, with a curve towards the west, and forms the Sea of *Obi*, in the Arctic Ocean. Its whole length is estimated at 2180 miles, the greater part of which is navigable. But this is not the river measured by geographers in their comparative scales of rivers: from its junction with the *Irtisch*, they abandon the *Obi*, and proceed with the former stream, which, at the point of union, is in a more direct line, though, above Tobolsk, it flows in nearly the same direction as the *Obi*, at the distance of a few degrees

to the westward. Like the *Obi*, it rises in the Great Altai chain; it passes through the Lake Zaizan, and enters Siberia about two hundred miles from its source. Numerous tributary streams afterwards swell its waters; among which are the large rivers *Issim* and *Tobel*: so that when it joins the *Obi*, at Samarova, it fully equals it in magnitude; and, from its direction, seems naturally entitled to retain its name to its confluence with the ocean.

THE YANG-TSE-KIANG, OR SON OF THE SEA.

Of the Chinese rivers, the *Yang-tse-kiang*, or *Son of the Sea*, deserves particular notice; the grandeur of its stream having struck all travellers. It originates in the Desert of Cobi, whence it makes its way between the Kola Mountains, into Tibet, the eastern side of which it traverses, under the name of *Kintcha-kiang*, in a southerly direction, collecting, in its way, the waters of many streams. On entering China, it is joined by the large river *Yalong-kiang*, and then takes a circuitous course, nearly across the middle of the country, towards the west, receiving, as it rolls along, the tribute of many rivers, and connecting itself with, or forming, several lakes of considerable size. Its whole length is computed at 3290 miles; its average breadth is upwards of two miles; and its numerous tributary streams, in some instances, equal the *Thames* for magnitude. In its course through the central parts of China Proper, it waters several cities; and, after passing Nankin, forms a kind of Delta, and falls into the Yellow Sea, nearly one hundred and forty miles east of that city.

THE GANGES.

The *Ganges*, one of the largest, though not the longest, rivers of Asia, and the most sacred stream of the Hindoos, issues from an opening, called by the natives *Gangoutri*, or the *Cow's Mouth*, situated among the perpetual snows of the Himalay chain, from whence it descends for a considerable distance among the mountains. This is the *Bhagirathi*, or most sacred branch of the *Ganges*; but the *Dauli*, being much longer, should be considered the principal source. This river proceeds from the immediate base of the highest part of the chain; and from Hurdwar to Allahabad, where it receives the *Jumna*, its width is from a mile to a mile and a quarter. After this junction, its course becomes more winding, and its bed wider, from various rivers which flow into it, so that its channel is sometimes three miles across, and frequently divided by islands. For about five hundred miles above its junction with the sea, its depth, when least, is about thirty feet. Previously to entering the ocean, its breadth suddenly expands, and the current, from being rapid, becomes so weak that it has not power to disperse the banks of mud and sand at its mouth: hence a Delta is formed, which commences about two hundred miles in direct line from the sea, or three hundred by the course of the stream; and the western branch constitutes the *Hooghly* river, on the east bank of which stands *Calcutta*. Between the mountains and the sea, the *Ganges* receives the waters of eleven large rivers; some of which are equal to the *Rhine*, and none less than the *Thames*. Like other large rivers, in or near the torrid zone, the *Ganges* is subject to periodical floods, by which, in the latter end of July, all the lower parts of Bengal are overflowed for a hundred miles in width; the villages and trees only being seen above the water.

PRINCIPAL RIVERS OF AFRICA.

THE NILE.

The *Nile*, as already stated, has two sources, at a great distance from each other. The first of these is situated nearly in the centre of Abyssinia, and rises in a small spring near the market-place of Sacala. From this fountain issues a rivulet, which flows northward into the Lake of Dembea. From the opposite side of the lake issues a river, supposed to be a continuation of the rivulet, which flows at first in a southerly direction, but afterwards sweeps to the north-west, under the name of Bahr el Azrek, or Blue River, and was supposed by Bruce and others to be the true Nile. On the other hand, at the distance of about seven hundred miles westward of the spring of Sacala, a river, called Bahr el Abiad, or White River, is formed by the confluence of several small streams, descending from the Donga Mountains, and takes a north-easterly course, till it meets the Bahr el Azrek. Their united waters constitute the Nile; and, notwithstanding Mr. Bruce's authority, a preference is now given to the Abiad as the main stream. During its passage through Upper Egypt, the stream is confined between two ranges of mountains, with only a narrow level space on each side; but, in the lower part of the country, the valley expands into the Delta, and the river divides into several streams before it reaches the sea. The ancients

reckoned seven of these outlets; but the only two of magnitude remaining, are those of Rosetta and Damietta.

THE NIGER.

The *Niger* is supposed, by Major Laing, to originate near the ninth parallel of north latitude, and about ten degrees of west longitude, in a range of mountains called Lomah; but Mr. Park considers its source to be in a spring near the eleventh parallel of latitude, and fifth degree of longitude. It at first flows towards the north, then, turning to the north-east, passes through Lake Dibbie, and reaches Timbuctoo. In this part, it is called by the natives Joliba. From Timbuctoo, under the name of Quôrra, it takes a south or south-eastern course, passes Boussa, where Mr. Park, unhappily, lost his life, waters Funda, and, soon afterwards, according to Mr. Lander, divides into numerous streams, forming a Delta, of which the Benin river in the west, and the Rio del Rey in the east, are the boundaries; the main stream issuing into the Gulf of Guinea, near Cape Formosa. The course and termination of this River have long been subjects of speculation: but the recent discoveries of the brothers Lander have thrown much new light on the question, which, it is expected, will be greatly increased by the present expedition.

PRINCIPAL RIVERS OF AMERICA.

In AMERICA, we meet with rivers exceeding in length any that are known in the Old World; but they mostly consist of a series of streams, connected in succession with each other, and ultimately finding their way to the sea by one common channel.

THE ST. LAWRENCE.

The *St. Lawrence* is an instance of this kind: it was formerly considered as issuing from Lake Ontario; from which it runs a course of more than 600 miles, and empties itself into the gulf called after itself. But it is now usual to take into the account of its length the Lakes Ontario and Erie, with their connecting stream, and the river Miami, which, rising near Fort St. Mary, in the state of Ohio, runs into the Erie, and is the reputed head of the *St. Lawrence*. In this sense, the length is increased to upwards of 1180 miles. The volume of water which it pours into the ocean is immense; for it is not less than ninety miles wide at its mouth, and its channel, which is very deep, receives nearly all the rivers that have their sources in the extensive chain of mountains, called the Land's Height, which separates the waters that fall into Hudson's Bay from those that enter the Atlantic. Some geographers consider the lakes Huron, Michigan, and Superior, with their connecting rivers, *Détroit* and *St. Mary*, as a continuation of the *St. Lawrence*, and thus extend its length to upwards of 2000 miles.

THE RIO DE LA PLATA.

The *Rio de la Plata*, estimated by the vast body of water that it pours into the ocean, is one of the largest rivers in the world. It is a continuation of the *Paraguay*, which has its sources in numerous streams, rising among the *Cordilleras* of *Brazil*. Most of these streams are themselves large rivers; and the combined waters are often so swollen by the periodical rains as to spread over the flat country to an extent of full three hundred miles; so that the canoes of the natives are navigated over the tops of the tallest trees. At *Corrientes*, after a splendid course of full 1300 miles, the *Paraguay* is joined by the *Parana*, a great river, which, rising in *Brazil*, brings with it the contents of numerous streams which flow into it during a course of 1600 miles; so that at its junction with the *Paraguay* it is the larger of the two, and supersedes it as to name. At this point, according to some, both rivers lose their name and, that of *Rio de la Plata*, or *Plate River*, is substituted, from the following occurrence: *Sebastian Cabot*, who first went up this river so far as the union of the *Paraguay* and *Parana*, entered the latter channel, and, routing the natives, took from them a vast booty in gold and silver. Supposing, therefore, that these metals abounded in the neighbourhood, he gave the river its present name, which it retains, although experience has proved that it has no precious metals on its banks; the plate of which Cabot robbed the Indians having been brought from *Peru*. Notwithstanding this anecdote, most writers continue the name of *Parana* to its junction with the *Uruguay*, and do not allow the *Plata* to commence

till then. The *Uruguay* is a noble river, and, though not equal to either the *Parana* or *Paraguay* for length of course, which is about 1100 miles, surpasses both in the rapid accession of waters it receives, which makes it, near its confluence with the former, fully equal, if not superior, in breadth. From this, and other accumulations, the *Plata* now forms an estuary of fresh water, without parallel in the rest of the world for breadth and magnificence. The current flows into the sea in such quantities, and with such force, that its fresh water remains long unmixed with the briny waves of the ocean. At *Buenos Ayres*, which lies about 200 miles from its mouth, the river is about thirty miles broad; and at its mouth, between *Capes St. Anthony* and *St. Maria*, its breadth is not less than 170 miles.

THE AMAZON, OR MARANON.

The *Amazon*, or *Maranon*, was, till lately, esteemed the longest river, not only of America, but of the whole world: recent discoveries, however, have transferred that honour to the *Mississippi*. It is, nevertheless, a magnificent river, and formed by the united waters of the *Ucayale* and the *Tunguragua*, aided by the *Apurimac* and its confluent streams. The *Beni*, or *Paro*, which rises among the mountains surrounding *La Paz*, in Upper *Peru*, and consists of the waters collected from various streams descending from the hills, is one of the head waters of the *Ucayale*, and the origin of the *Maranon*. Among other accessories, it receives the waters of the *Tunguragua*, which issues from a lake in the *Cordilleras* of *Lima*, and by accessions from numerous rivers, some of which are of considerable magnitude, becomes a large river, known by the names of *Maranon* and *Orellana*. After this it receives the *Ucayale*, besides other large rivers, which drain a considerable part of South America; so that at its entrance into the Atlantic it is nearly 180 miles in breadth. The force with which this immense body of water is poured into the ocean is manifested by its remaining unmixed with those of the sea, for a space of eighty leagues. Its banks are covered with forests, and its swellings from periodical rains frequently convert the adjacent country into a fresh-water lake, several hundred miles in extent.

THE MISSISSIPPI.

The *Mississippi* is the common channel by which all the rivers that have their rise in the immense valley between the *Rocky Mountains* and the *Alleghany* chain, are carried to the ocean; and for the length of its course, added to the quantity of water which it discharges, may be justly ranked among the greatest rivers of the globe. The *Mississippi* has its source in some lakes, among which the principal are the *Red Cedar* and *Leech Lakes*, and, following a very winding channel, which receives continually fresh accessions of water by the junction of numerous large rivers, falls into the *Gulf of Mexico*, by several outlets. Its length is about 2400 miles; and in this sense it falls considerably short of the *Maranon*: hence, in geographical works of some years' standing, the latter is spoken of as the longest river in the world. But since the *Missouri*, which flows into it,

and rivals it in breadth, has been explored, the length of that river and its auxiliaries, the Yellowstone and Bighorn, are taken into the measurement, to the extent of 3700 miles ; of which the Mississippi occupies only between 1300 and 1400 ; that is, from its junction, a little above the town of St. Louis. The sources of the Missouri, the Yellowstone, and the Bighorn, are within a few miles of each other, among the Rocky Mountains ; and their united stream receives in its way several rivers, particularly the Platte and the Kansas. After its junction with the latter, the Missouri becomes very broad ; and, pursuing its westerly direction, joins the Mississippi, at the distance of 2400 miles from its source. It is subsequently enlarged by the Ohio, and the Rio Rojo, or Red River, both of considerable magnitude. After this, the Mississippi inclines to the south-east, and, dividing into several branches, makes its way to the Gulf of Mexico ; the main stream passing by New Orleans, and entering the Gulf 102 miles below that city. The Mississippi is subject to two rises in the year : one about January, occasioned by periodical rains that fall towards the lower part of its course ; and the great flood, in summer, is produced by the melting of the ice in the upper part of the continent, where the Missouri and other tributary springs have their origin.

THE ORONOCO.

The ORONOCO is distinguished by its very singular and irregular course. It appears to be the outlet to most of the rivers by which the territories of the present Republic of Columbia are watered ; the source of many of its waters is in the northern part of the great chain of the Cordilleras, and others arise from the high lands with which the eastern part of that country is covered. It enters the Atlantic by many channels opposite to the island of Trinidad ; the most southerly of these is the principal mouth, and full eighteen miles in width ; the navigation of all of them is extremely dangerous. The course of the river, when it enters the sea, is so powerful, that it preserves the freshness of its waters for the distance of thirty-six miles from its mouth. The beauty and grandeur of its banks surpass all description. Forests of the most superb verdure are crowded with monkeys, and birds, of the most various and brilliant colours ; and sometimes immense plains form an horizon of sixty or ninety miles in extent.

It is subject to an annual inundation, which begins in April, and ends in August, and sometimes extends for 600 miles in length, and from sixty to ninety in width. Its banks are but thinly inhabited, and its streams are much infested by the alligator, which grows there to an immense size.

TERMINATION OF RIVERS.

The sea is the general receiver of rivers ; but some are intercepted in their course, and form lakes, which frequently discharge their waters on the lowest side, or, in the form of cataracts, into the next valley, through which they continue their course to the ocean, or to some intervening lake. In many cases, the superfluity of water is taken off by evaporation and absorption. When the basin of the lake is of sufficient capacity to allow a quantity of water equal to what it receives to be taken away by absorption, or exhausted by evaporation, it becomes the final receptacle of the rivers which flow into it. Such is the case with the rivers terminating in the Caspian and Aral lakes, or seas. In some of the sandy plains of the torrid zone, the rivers divide off into different branches, which are gradually exhausted by the increased absorption and evaporation caused by the heat of the climate.

PERIODICAL RIVERS.

Some rivers are much increased by frequent rains or melted snows. In Peru and Chili, are small rivers which flow only during the day, because they are fed by the melting of the snow from the summit of the Andes, which takes place only while the sun shines upon them. In Hindostan, and on both sides of the extreme parts of Africa, rivers exist, which, though they flow both night and day, are, from the accession of snow-water, much greater by day than in the night. In these places, also, the rivers are nearly dry in the summer, but overflow their banks in the rainy or winter season.

INUNDATIONS OF RIVERS.

All considerable rivers, and especially such as rise in the tropical climates, have their periodical overflows, which are, in some cases, to such an extent, that the adjacent country is inundated many miles around. The only

instance of this kind with which the ancients were familiar, was that of the Nile ; and, being ignorant of the cause, they looked upon it as a prodigy, for which they could not account. Subsequent discoveries have shown that a periodical increase is common to many rivers, and that it is produced by the rains and melted snows upon the mountains whence they derive their source. The inundations of the Nile, the most regular, if not the most extensive of any, are caused by the periodical rains, which descend on the mountains in the interior of Africa, where it originates ; the rains commence in April ; the river begins to overflow in June ; is at its height in September ; and returns within its banks in October. The Ganges, the Indus, and the great rivers of Siam, in Asia ; the Senegal, in Africa ; the Oronoco, the Maranon, and Paraguay or La Plata, in South America, are all more or less subject to similar inundations ; but at different times of the year, according to the promoting cause. Such as are swollen by rains, are usually highest in winter, or immediately after the rainy season ; those which derive their increase from snow, which is in some places melted in spring, in others in summer, and in some countries between both those seasons, have their inundations accordingly. The Tigris rises twice in the year : first, and most remarkably, in April, in consequence of the melting of the snows in the mountains of Armenia ; secondly, in November, through an accession from the periodical rains.

The most remarkable case of the rise and fall of a river in Europe, is that of the Volga, which, in May and June, is filled with water, and overflows its shelves and islands ; though, at other times, it is so shallow as scarcely to afford navigation for loaded ships.

EVANESCENT (OR DISAPPEARING) RIVERS.

Some rivers suddenly disappear in their course ; hiding themselves, as it were, in the earth, either partially or altogether : in the former case, they re-appear at a distance from the point of their immersion, as new rivers ; in the latter, they are lost entirely.

The Tigris, about twenty miles from its source, meets with a mountainous ridge at Diglou ; and, running under it, flows out on the opposite side : after passing through the lake Erzen, it again disappears, and flows about eighteen miles underground, when it breaks out afresh. In our own country, we have examples of this disappearing and rising again of rivers, in the Mole, in Surrey, and the small rivers Hamps and Manifold, in Derbyshire. The Mole is lost soon after it has passed by Box Hill, and reappears a little before it reaches Leatherhead ; the Hamps has an underground passage of seven miles ; and the Manifold, a similar course of five miles in extent.

There are also some rivers of Normandy, which alternately lose themselves and re-appear : these are the Rille, the Ithon, the Aure, the Sap-André, and the Drôme. The first three disappear gradually, and rise to sight again ; the Sap-André, after being drained of a considerable portion of its water as it flows along, is suddenly lost ; but afterwards re-appears : the Drôme, also, loses some of its waters in its course, and ends by falling into a cavity, without being known to rise again. The Rille, the Ithon, and the Aure, pass over a porous soil, composed of thick sand, not well compacted, which sinks suddenly down in some places, and forms large holes : and when the water overflows the meadows, it frequently makes numerous cavities in them.

The Drôme, after losing some of its water in its passage, vanishes near the pit of Soucy, where it meets with a kind of subterraneous cavity, nearly twenty-five feet wide, and more than fifteen deep, into which it enters, without any perceptible motion, and never appears again.

In the vicinity of Paris, the river Jerre is lost in the same manner as the Rille.

Our limits prevent us from completing this very interesting subject in one paper ; we must therefore return to it, in a future *SUPPLEMENT*, in which the Cataracts, Waterfalls, &c., to be described, will be illustrated by some beautiful Engravings.

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